

Clinical usefulness of virtual reality: Illustration through case studies

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Virtual Reality: Theoretical background



What is virtual reality (VR)?

= a technology allowing individuals:

1) to *explore* 3D virtual environments in real time

e.g. walk in a supermarket, wait in a train station

2) to *interact* with the environments

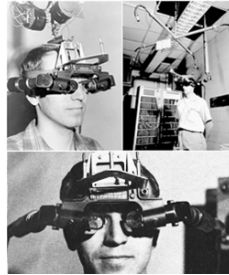
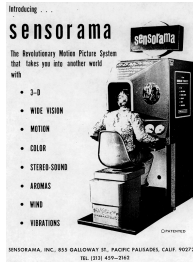
e.g. pick up objects, talk to avatars



C2Care environments



Since when do we use VR and in what purpose?



Since 1933

Authors and producers think up devices which might transport individuals in other virtual worlds

1962

Release of the movie « **Sensorama** », a cinematic experience augmented with movements, smells,...to enhance the immersion in the story

1966

First VR headset
Ultimate Display
< Ivan Sutherland

80'

Use of VR by the NASA
& the army to train
pilots

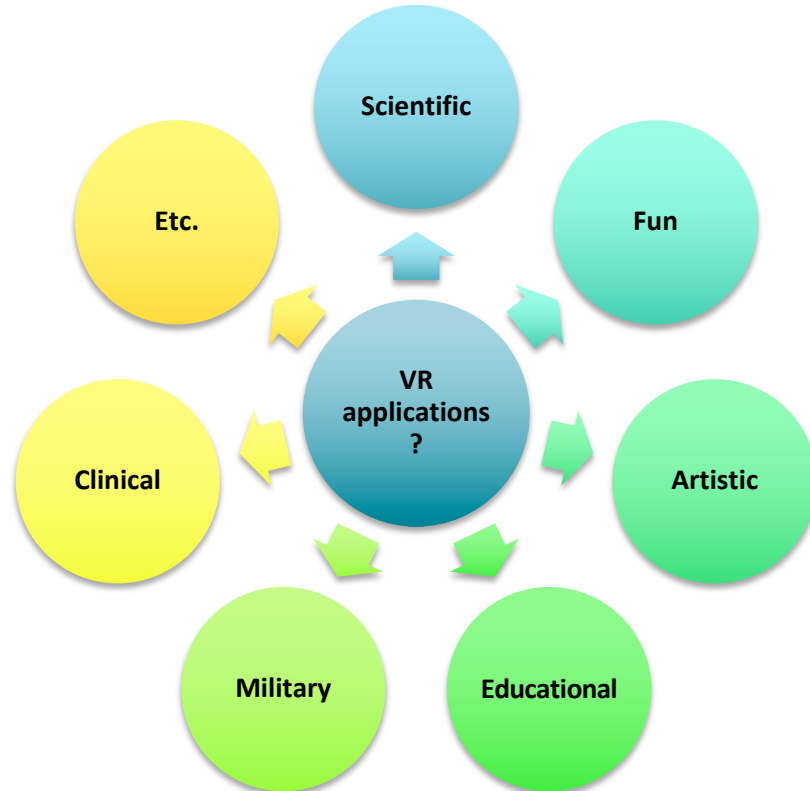
1992

First use of VR in a therapeutic goal
by researchers of the Virtual Reality
Technology Laboratory (fear of
flying)





Today, VR applications are various!





What are the clinical applications of VR?

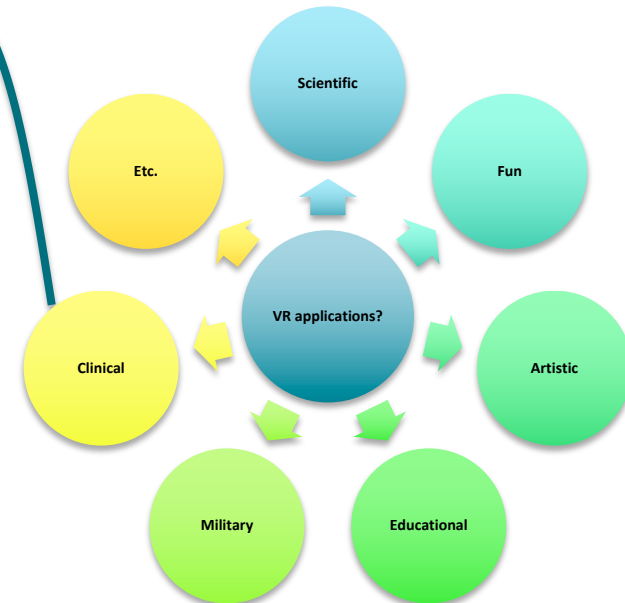
- ▶ In psychology, VR = training tool within a psychological treatment
 - ▶ Virtual Reality Exposure Therapy (VRET)
// classical cognitive-behavioral exposure therapy (CBT)

Why using VR in therapy?

< reluctance for *in vivo* exposure

→ 60 to 80% of phobic patients don't ask for professional help

→ 25% decline exposure therapy





Virtual Reality Exposure Therapy (VRET)



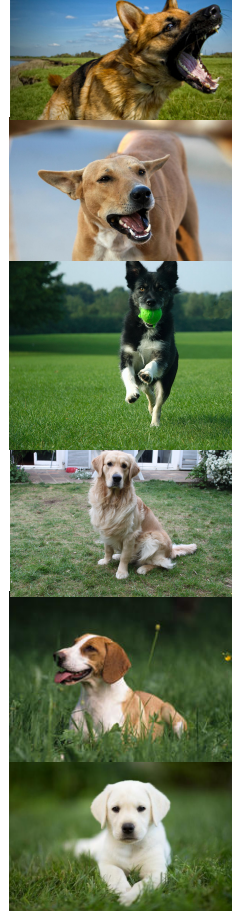
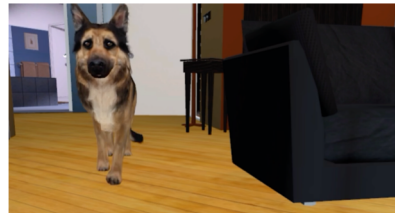
VRET: What aim?

- **Extinction** of the fear (// classical CBT)



VRET: How?

- ▶ Use of the principles of classical exposure therapy
 - ▶ *Graded, progressive* and *repeated* exposures to objects or locations eliciting anxiety (e.g., plane, elevator, spiders, dogs)
 - ▶ Through VRET, reality is replaced by **artificial stimuli** which are controlled in a virtual environment



VRET: How?

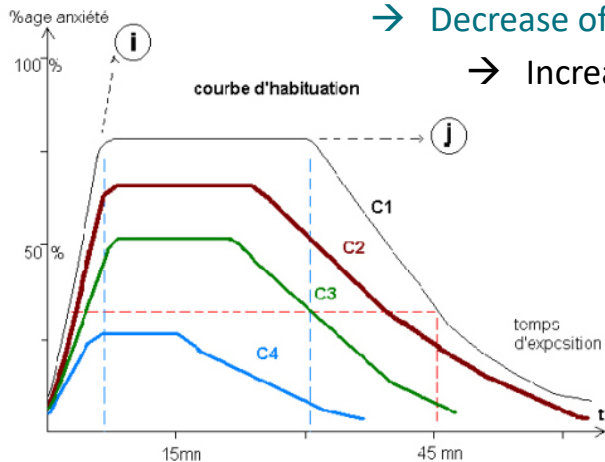
► Confrontation to objects

→ Increase of the anxiety

→ Habituation « Stay & practice »

→ Decrease of the fear and of the avoidance behavior

→ Increase of the sense of self-efficacy





VRET: Clinical usefulness?

- ▶ Since 1999, growing interest for the field of « *cyberpsychology* »
 - Increase of the number of studies assessing (1) the *usefulness* & (2) the *efficacy* of VRET

The effectiveness of virtual reality based interventions for symptoms of anxiety and depression: A meta-analysis

Liviu A. Fodor^{1,2}, Carmen D. Cote¹, Pim Cuijpers^{3,4}, Ștefan Szamoskozi², Daniel David^{5,7} & Ioana A. Cristea^{3,4}
Clinical Psychology and Psychotherapy
Clin. Psychol. Psychother. 7, 209–219 (2000)

Virtual Reality-Based Experiential Cognitive Treatment of Obesity and Binge-Eating Disorders

Giuseppe Riva^{1,2,3,4}, Monica Bacchetta¹, Margherita Baruffi², Silvia Rinaldi², Francesco Vincelli^{1,4} and Enrico Molinari^{2,3,4}



Documenting the Efficacy of Virtual Reality Exposure with Psychophysiological and Information Processing Measures

Sophie Côté¹ and Stéphane Bouchard^{1,2,3}

L'utilisation de la réalité virtuelle dans le traitement des troubles mentaux

Eric Malbos¹, Laurent Boyer², Christophe Lançon¹

Virtual Reality Intervention for Older Women with Breast Cancer

SUSAN M. SCHNEIDER, Ph.D., R.N.¹, MATHEW ELLIS, M.D., Ph.D.², WILLIAM T. COOMBS, Ph.D.³, ERIN L. SHONKWILER, R.N., M.S.N.¹, and LINDA C. FOLSOM, R.N., B.S.N.³

VIRTUAL REALITY EXPOSURE FOR PHOBIAS: A CRITICAL REVIEW

Sophie Côté, Ph.D.¹ and Stéphane Bouchard, Ph.D.¹

La réalité virtuelle au service de l'évaluation clinique de la personne âgée : le dépistage précoce de la démence

Virtual reality for clinical assessment of elderly people: Early screening for dementia

M. Déjos^{*}, H. Sauzéon, B. N'Kaoua

Cognitive Mechanisms Underlying Virtual Reality Exposure

Sophie Côté, Ph.D.¹ and Stéphane Bouchard, Ph.D.^{1,2}

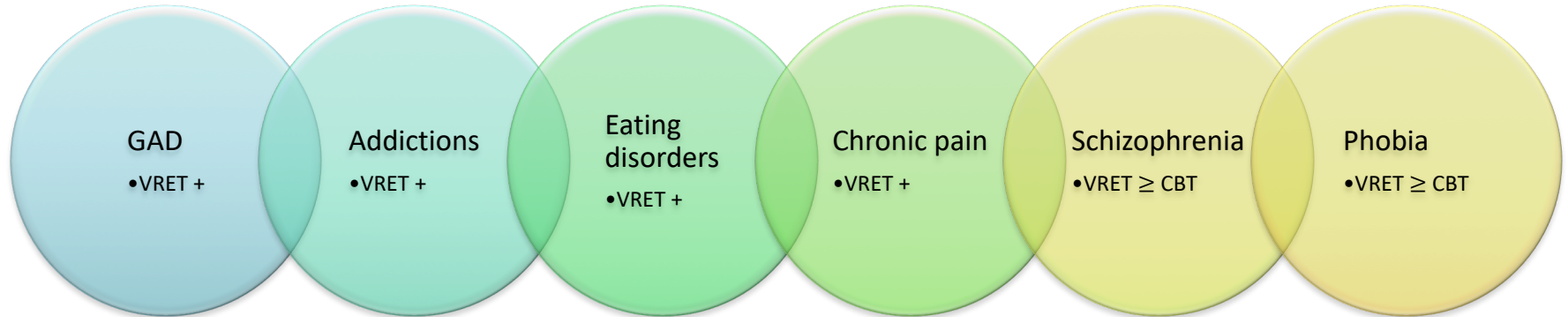
RESEARCH ARTICLE

The Impact of Virtual Reality on Chronic Pain

Ted Jones^{1*}, Todd Moore², James Choo¹



VRET: Clinical usefulness?





VRET: Clinical usefulness?

Overall, $VRET \geq CBT$

→ VRET seems **beneficial** for patients

AND

Apparent **preference** for VRET (Garcia-Palacios et al., 2007)

BUT

Lack of randomized trials comparing VRET to standard treatment (i.e., CBT)

Lack of follow-ups



Case studies



Case studies

Research & clinical question

Reminder – Underlying principles of exposure therapy

Confrontation to objects

- Increase of the anxiety
 - Habituation « Stay & practice »
 - Decrease of the fear and of the avoidance behavior
 - Increase of the sense of self-efficacy

Until now, studies focused on the level of ***fear*** and ***avoidance behavior***

► How VRET influences the ***sense of self-efficacy*** ?





Miss C suffering from acrophobia

- ▶ 29 years, married, PhD Student, likes hiking in the mountains
- ▶ Specific phobia (acrophobia = fear of height)
 - ▶ Important physical symptoms: oppression, perspiration when confronted to ravines
- ▶ VRET: 4 sessions including 3 VR exposures
- ▶ General Self-Efficacy Scale
 - ▶ Pretreatment : 28 (max. 40)
 - ▶ Posttreatment : 32 (max. 40)





Mister D suffering from fear of talking in public

- ▶ 72 years, married, retired (veterinarian)
- ▶ Specific phobia (fear of talking in public)
 - ▶ Important physical symptoms: blushing, oppression, perspiration
- ▶ VRET: 4 sessions including 2 VR exposures
- ▶ General Self-Efficacy Scale
 - ▶ Pretreatment : 32 (max. 40)
 - ▶ Posttreatment : 35 (max. 40)





Conclusion



Conclusion



- ▶ VR ≠ « recent » technology



- ▶ But its use in clinical psychology is relatively new
- ▶ Even though there is a growing interest and an increase in the number of studies in cyberpsychology, some issues should be addressed in future research (i.e., lack of RCT and follow-ups)
 - ▶ Case studies can be relevant in that purpose < results might be obtained more quickly

Thank you for your attention

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